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The impact factor of *Acta Palaeontologica Polonica*

GRZEGORZ RACKI and ANDRZEJ BALIŃSKI

The impact factor for *Acta Palaeontologica Polonica* was calculated on the basis of a citation database provided by the Institute for Scientific Information in Philadelphia. It appears that *APP* is improving its position within the group of leading international palaeontological periodicals, with IF increasing from 0.167 in 1992 to 0.576 in 1997. *APP* is the only Earth Sciences representative among 35 Polish journals included in the ISI citation database.

The most complete and prestigious system of indexation of international science and technology journals is that provided by the Institute for Scientific Information (ISI) in Philadelphia. About 5600 titles are indexed there (see the ISI Homepage <http://www.isinet.com>). *Acta Palaeontologica Polonica* (*APP*) was first included in the coverage by the Science Citation Index Expanded as late as 1996, and is thus relatively new to the system. Obviously, we can hardly compete with journals which are well established in the scientific market, the more so since palaeontology is one of the smallest among 160 fields covered by ISI. Nevertheless, after three years of being scored by ISI, it is an appropriate time to determine our starting point for future development. In principle, to find the position of a source journal in the ISI ranking it is enough to consult the annually published Journal Citation Reports – 1997 Science Edition (JCR), where values of impact factor and other bibliometric figures are presented for most of the indexed journals. The JCR reports the average number of citations that recently published papers in a given journal receive in a current year, revealing relative importance among periodicals, particularly those in the same or similar disciplines. Unfortunately, such data are not presented for *APP*, because 'two years of article counts are required; the journal will be listed in the 1998 JCR' (J. Robertson personal communication). For the same reason, the indices are also missing for the thematically related Newsletter on Stratigraphy, *Paleontologičeskij žurnal*, Proceedings of the Yorkshire Geological Society, and Rivista Italiana di Paleontologia e *Stratigrafia*, all introduced in 1996–1997 as well.

Our need to know the impact factor for *APP* is not simply a matter of curiosity. It is the current policy of the grant-bestowing State Committee for Scientific Research to favour those Polish journals which are in the ISI coverage (on the 'Philadelphia list'). More importantly, it is assumed that the journal impact factor sufficiently evaluates published papers (and thus the quality of research), which influences the subsidization of scientific institutions in Poland. The employment of journal impact factors as surrogates of actual citation counts for particular authors and articles has been criticised (e.g., Seglen 1997), but this index may be viewed as an approximation of success probability for recently published papers. In fact, ISI does not recommend dependence exclusive on citation data in journal evaluations. The ISI bibliometric indices are not intended to substitute totally for informed peer reviews.

As *APP* is still absent from the authorised ranking, we have determined its conventional two-year impact factor using the standard ISI formula (Gatfield 1990; Hojortgaard Christensen et al. 1997):

$$IF_{1997} = \frac{c_{95} + c_{96}}{a_{95} + a_{96}}$$

where:

IF₁₉₉₇ – impact factor for 1997;

c95, c96 – number of citations received in 1997, taken from Science Citation Index Expanded, to source items published in 1995 and 1996, respectively;

a95, a96 – number of original research (including notes) and review articles published by the journal in 1995 and 1996, respectively.

It should be emphasized that the citation counts in the JCR do not distinguish between citations of letters, book reviews, or research papers, but recent article numbers in the JCR are limited to original research and review articles only. The source items not defined by ISI as citable documents (editorials, book reviews, letters, corrections, meeting abstracts, etc.) are also sporadically cited and do contribute to the citation counts of a periodical (see Hojortgaard Christensen et al. 1997; Seglen 1997). Consequently, the actual scores for APP are:

$$\text{IF}_{1997} = \frac{\text{Number of citations}}{\text{Number of articles}} = \frac{11+8}{17+16} = 0.576$$

Nineteen citations in 1997 to APP refer to twelve original papers and one paper review of the total of 47 source items. Just two of these (by Gambaryan & Kielan-Jaworowska on Cretaceous multituberculate mammals and by Kozłowska-Dawidziuk on retiolitid graptolites) have received 3 citations each (see Table 1). Based on these calculations the position of APP can be established with respect to the other 24 palaeontological journals impact-rated in JCR (Table 2). The Paleontology category, being a subfield of Geoscience in the ISI scheme, includes 'journals that focus on the study of life and physical conditions, such as climate and geography, of past geological periods as recorded by fossil remains'.

It appears that APP is improving its position within the group of original research periodicals, with IF increasing from 0.167 in 1992 to 0.370 in 1995 (see Racki 1997), and to 0.576 in 1997. APP was established in 1956 and papers from all its (42) volumes were most frequently cited in 1997 in *Palaeontology* (34 times), *Journal of Paleontology* (26) and *Cretaceous Research* (10). In addition, if we only count citations for APP from other journals, this External Cited IF 1997 is also high (0.394); this property implies a low self-citation level (both for the journal itself and authors) and the relatively significant knowledge export to world science (Hojortgaard Christensen et al. 1997), which is a diagnostic feature of international impact (Wormell 1998). Undoubtedly, APP is not a national-based ('domestic-oriented') journal since of 33 papers published in 1995–1996, only 14 were written exclusively by Polish authors, and the link between author internalization and citation internalization is well established in this case (see also Wormell 1998; Zitt & Bassecoulard 1998). The combination of good quality journal characters with a low price, contribute to the rising value of APP for subscribers (see discussion in Ribbe 1990). Nevertheless, it is hard to predict future developments in the ranking of our journal even if the rise of its IF also continued in 1998 (estimated by us at 0.649, i.e., 24 citations in 1998 of 37 articles from 1996–1997, including one brief report; see Table 3).

Generally, periodicals keep a similar position year after year (Garfield 1990), even if an overall decrease of impact factors for the palaeontological journals has been detectable recently (compare the 1995 list in Racki 1997). The main exceptions are *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology* and *Journal of Foraminiferal Research*. The interdisciplinary *Paleoceanography* and *Paleobiology* permanently occupy the top locations in the list, while the Elsevier journals (*Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*, and *Marine Micropaleontology*), *Journal of Quaternary Science*, *GFF* (first time in JCR), and *Journal of Vertebrate Paleontology* form a palaeontological core.

It is necessary to remember that palaeontology is among the low-impact ISI categories, and does not generate as many papers (and therefore cited references), as e.g., genetics, biochemistry or molecular biology; this limitation in fact concerns all Earth sciences (Blair 1992). So, coverage of fields varies widely and no palaeontological journal can be compared with, for example, *Annual Review of Biochemistry* with its impact factor for 1997 of 40.782, or *Cell* with 37.796. In ad-

dition, the thematic ranges of many periodicals in modern palaeontology, as broadly outlined by ISI, are in fact transitional to other fields of Earth sciences (mostly divided between Geosciences and Life Sciences; see also Klimley 1993). Clearly, relatively traditional palaeontological journals, dealing primarily with systematics and fossils, are not especially prosperous, as exemplified by the decreasing impacts of *Palaentology* and *Micropalaentology*. On the other hand, the citation response to 'standard' palaeontological papers seems to be generally more delayed than in other fields of science. This is well exemplified by differences between palaeontological periodicals with wider and narrower scopes. For the relatively general *Paleoceanography*, *Paleobiology*, and *Palaeoecology*, in 1997 citations of papers published in 1988–1997 contributed 61.28, 54.41, and 49.47 percent, respectively. This was distinctly more than in the case of *Micropalaentology* (28.67), *Alcheringa* (29.22), and *Palaentology* (29.43). Such differences must strongly influence the short-term IF index.

APP is the only Earth sciences representative among 35 Polish journals included in the ISI citation database. Most others represent biological and chemical sciences. In its impact factor value APP is in a high (8th) position among 22 Polish ISI periodicals classified in JCR 1997. With the exception of the higher-rated *Acta Astronomica* (IF = 1.300) and *Journal of Physiology and Pharmacology* (0.962), none of these journals has an IF exceeding 0.6 (e.g., *Chemia Analityczna* – 0.564, *Acta Theriologica* – 0.549, *Acta Protozoologica* – 0.500, *Polish Journal of Chemistry* – 0.468, *Acta Physiologiae Plantarum* – 0.444, *Folia Biologica* – 0.358, *Acta Physica Polonica A* – 0.311, *Acta Societatis Botanicorum Poloniae* – 0.034), *Acta Biologica Cracoviensia* has nil indices. When compared with the mean IF within a field, two mathematical journals, *Acta Arithmetica* and *Studia Mathematica*, belong to the highest prestige serials in world science in 1997.

Recently, the ISI announced the 1998 IF listing (JCR – 1998 Science Edition) and the score computed for APP was 0.270 only. According to the ISI, only 10 citations were found in 1998. These figures seem to be significantly underestimated. As demonstrated in Table 3, there are at least 24 citations of APP publications in 1998 (IF = 0.649).

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Table 1. List of citations of papers from *Acta Palaeontologica Polonica* 1996–1997, to document the estimation of the impact factor 1997 (IF = 0.576)

Cited paper <i>Acta Palaeontologica Polonica</i> 1995 (v. 40)–1996 (v. 41)	Citing paper in 1997
Gambaryan, P.P. & Kielan-Jaworowska ¹⁾ Z. 40, 45–108	Cifelli RL, Kirkland JI, Weil A, et al., P NATL ACAD SCI USA 94: (21) 11163–11167, OCT 14, 1997 Novacek MJ, CURR BIOL 7: (8) R489–R491, AUG 1, 1997 Kielan-Jaworowska Z, Hurum JH, ACTA PALAEONTOL POL 42: (2) 201–242, JUN 1997
Sigogneau-Russell D. & Hahn, R. 40, 245–260	Butler PM, J VERTEBR PALEONTOL 17: (2) 435–439, JUN 1997 Sigogneau-Russell D, Godefroit P, CR ACAD SCI II A 324: (2) 135–140, JAN 1997
Collins J.S.H. et al. 40, 165–210	Vega FJ, Feldmann RM, Ocampo AC, et al., J PALEONTOL 71: (4) 615–620, JUL 1997
Chen, J.Y. et al. 40, 213–244	Dzik J, Zhao YL, Zhu MY, PALAEONTOLOGY 40: 385–396, Part 2, MAY 1997
Kozłowska-Dawidziuk ¹⁾ A. 40, 261–326	Kozłowska-Dawidziuk A, ACTA PALAEONTOL POL 42 (3), 391–412, SEPT 1997 Loydell DK, Storch P, Bates DEB, PALAEONTOLOGY 40: 747–762, Part 3, AUG 1997 Zhang YD, Lenz AC, CAN J EARTH SCI 34: (9) 1220–1238, SEP 1997
Morycowa, E. & Roniewicz, E. 40, 361–385	Pandey DK, Lathuillière B, J PALEONTOL 71: (4) 564–577, JUL 1997
Stolarski, J. 41, 339–367	Fedorowski J, ACTA PALAEONTOL POL 42: (4), 446–456, DEC 1997
Zhen, Y.Y. 41, 59–88	Zhen YY, West RR, ALCHERINGA 21: (3–4) 271–280, 1997
Hurum, J.H. et al. 41, 253–275,	Kielan-Jaworowska Z, Hurum JH, ACTA PALAEONTOL POL 42: (2) 201–242, JUN 1997
Kaźmierczak, J. et al. 41, 319–338	Briggs DEG, Wilby PR, Perez-Moreno BP, et al., J GEOL SOC LONDON 154: 587–588, Part 4, JUL 1997
Machalski, M. 41, 369–383	Christensen WK, ACTA PALAEONTOL POL 42: (4) 457–495, DEC 1997
Filipiak, P. & Krawczyński W. 41, 413–425	Anderson LI et al., GEOL J 32, 197–210, 1997
Dzik, J. 41, 58	Keighley DG, Pickerill RK, ATLANTIC GEOL 33: (3) 181–215, NOV 1997 Pickerill RK, Keighley DG, ACTA PALAEONTOL POL 42: (1) 171–174, MAR 1997

¹⁾ Long author's names have to be searched in truncated and/or single-word form (e.g., KIELANJAW* for KIELAN-JAWOROWSKA), because they are shortened in ISI databases in a different manner.

Table 2. Palaeontology journals ranked by impact factors (after Journal Citation Reports – 1997 Science Edition)

Rank	Journal title	Impact factor (IF) 1997	IF 1997 – IF 1995	Total citations in 1997 (citations in 1997 to articles published in 1995–1996)	Source items in 1997
1	<i>Paleoceanography</i>	3.160	–0.560	2061 (376)	64
2	<i>Paleobiology</i>	1.959	–0.412	1098 (143)	27
3	<i>Journal of Quaternary Science</i>	1.459	–0.608	404 (89)	36
4	<i>Palaeogeography Palaeoclimatology Palaeoecology</i>	1.319	+0.364	2518 (331)	158
5	<i>Marine Micropaleontology</i>	1.184	–0.595	941 (103)	71
6	<i>GFF*</i>	1.115	no data	87 (58)	41
7	<i>Journal of Vertebrate Paleontology</i>	1.036	no data	541 (142)	70
8	<i>Palaios</i>	1.012	–0.308	542 (86)	43
9	<i>Facies*</i>	1.000	no data	216 (51)	42
10	<i>Journal of Foraminiferal Research</i>	0.860	+0.277	488 (49)	24
11	<i>Vegetation History and Archaeobotany*</i>	0.800	no data	67 (40)	13
12	<i>Transactions of the Royal Society of Edinburgh – Earth Sciences</i>	0.780	+0.158	324 (46)	8
13	<i>Géographie Physique et Quaternaire</i>	0.667	+0.140	277 (36)	31
14	<i>Lethaia</i>	0.632	–0.161	558 (48)	38
15	<i>Review of Palaeobotany and Palynology</i>	0.623	–0.077	953 (114)	79
16	<i>Palaeontology</i>	0.607	–0.320	892 (68)	49
17	<i>Acta Palaeontologica Polonica**</i>	0.576	+0.175	>179*** (19)	20
18	<i>Journal of Paleontology</i>	0.479	+0.087	1636 (114)	103
19	<i>Micropaleontology</i>	0.449	–0.295	581 (22)	26
20	<i>Cretaceous Research</i>	0.444	+0.029	280 (36)	43
21	<i>Alcheringa</i>	0.441	–0.021	226 (15)	21
22	<i>Proceedings of the Geologists' Association</i>	0.373	no data	355 (19)	27
23	<i>Geobios</i>	0.350	+0.136	396 (36)	58
24	<i>Journal of Micropalaeontology*</i>	0.289	no data	62 (11)	25
25	<i>Stratigrafia i Geologicheskaya Korelatsiya – Stratigraphy and Geological Correlation*</i>	0.061	no data	22 (7)	63

* First time introduced to JCR.

** Non-impact rated in JCR – IF is assessed by authors after detailed article-by-article analysis for *APP* 1995–1996, according to the **first author name**. J. Robertson (personal communication) informed us that the JCR production program is based on a citation search for the **journal title**; this method resulted in only 4 recovered citations (IF = 0.121) when she used the 'standard abbreviation' ACTA PALAEONTOL POL, and 15 citations for the truncated version ACTA PALAEONTOL* (IF = 0.455); 4 extra citations identified by us refer to still further codes of *APP* recorded in the ISI database, such as ACTA PAL POLONICA. So this approach is limited by 'primary' errors introduced to references by authors in the indexed paper and by 'secondary' errors made by the ISI indexers (see examples in Blair 1992), it is also affected by differences in the way journals are coded.

*** Total citations extracted from periodicals from Palaeontology and Geology fields only.

Table 3. List of citations of papers from *Acta Palaeontologica Polonica* 1996–1997, as a documentation for estimation of the impact factor 1998 (IF = 0.649)

Cited paper <i>Acta Palaeontologica Polonica</i> 1996 (v. 41) – 1997 (v. 42)	Citing paper in 1998
Yong-yi Zhen 41, 59–88	Pedder AEH, J PALEONTOL 72: (6) 967–991 NOV 1998
Szaniawski, H. & Imajima, M. 41, 111–125	Hints O, ACTA PALAEONTOL POL 43: (3) 471–516 SEP 1998 Eriksson M, Bergman CF, J PALEONTOL 72: (3) 477–485 MAY 1998 Eriksson M, GFF 120: 21–25 Part 1 MAR 1998
Hoare, R.D. <i>et al.</i> 41, 127–145	Rudkin DM, CAN J EARTH SCI 35: (7) 827–831 JUL 1998
Hurum, J.H. <i>et al.</i> 41, 253–275	Hurum JH, ACTA PALAEONTOL POL 43: (1) 21–52 MAR 1998
Kaźmierczak, J. <i>et al.</i> 41, 319–338	Tribovillard NP, TERRA NOVA 10: (3) 126–130 JUN 1998
Stolarski, J. 41, 339–367	Feinstein N, Cairns SD, NAUTILUS 112: (3) 73–83 OCT 15 1998 Ezaki Y, PALEOBIOLOGY 24: (2) 227–234 SPR 1998
Trammer, J. & Kaim, A. 42, 1–12	Alroy J, SCIENCE 280: (5364) 731–734 MAY 1 1998
Gambaryan, P.P. & Kielan-Jaworowska, Z. 42, 13–44	Hurum JH, ACTA PALAEONTOL POL 43: (1) 21–52 MAR 1998 Kielan-Jaworowska Z, ACTA PALAEONTOL POL 43: (1) 131–134 MAR 1998
Dzik, J. 42, 57–170	Zhuravlev AV, P GEOLOGIST ASSOC 109: 161–168 Part 3 1998
Pickerill, R.K. & Keighley, D.G. 42, 171–174	Keighley DG, Pickerill RK, ATLANTIC GEOL 34: (2) 83–112 JUL 1998
Kielan-Jaworowska, Z. & Hurum, J.H. 42, 201–242	Hurum JH, ACTA PALAEONTOL POL 43: (1) 21–52 MAR 1998 Kielan-Jaworowska Z, ACTA PALAEONTOL POL 43: (1) 131–134 MAR 1998
Averianov, A.O. 42, 243–256	Rougier GW, Wible JR, Novacek MJ, NATURE 396: (6710) 459–463 DEC 3 1998
Mutvei, H. 42, 375–390	Mutvei H, GFF 120: 375–378 Parth 4 DEC 1998
Baliński, A. 42, 427–435	Racki G, Baliński A, ACTA PALAEONTOL POL 43: (2) 273–304 JUN 1998 Godefroid J, Helsen S, ACTA PALAEONTOL POL 43: (2) 241–272 JUN 1998 Rzhonsnitskaya MA, Markovskii BP, Yudina YA, <i>et al.</i> , ACTA PALAEONTOL POL 43: (2) 305–344 JUN 1998 Racki G, ACTA PALAEONTOL POL 43: (2) 395–411 JUN 1998
Trofimov, B.A. 42, 496	Kielan-Jaworowska Z, Dashzeveg D, ACTA PALAEONTOL POL 43: (3) 41–34 38 SEP 1998 Sigogneau-Russell D, Ensom F, CRETACEOUS RES 19: (3–4) 445–470 JUN–AUG 1998